

# Temposonics®

Magnetostrictive Linear Position Sensors

## GT2/GT3 Analog Redundant Data Sheet

- Double or triple redundant
- For enhanced safety applications
- Pressure-resistant high-grade steel rod



## MEASURING TECHNOLOGY

For position measurement, the absolute, linear Temposonics® position sensors make use of the properties offered by the specially designed magnetostrictive waveguide. Inside the sensor a torsional strain pulse is induced in the waveguide by momentary interaction of two magnetic fields. The interaction between these two magnetic fields produces a strain pulse, which is detected by the electronics at the head of the sensor. One field is produced by a moving position magnet, which travels along the sensor rod with the waveguide inside. The other field is generated by a current pulse applied to the waveguide. The position of the moving magnet is determined precisely by measuring the time elapsed between the application of the current pulse and the arrival of the strain pulse at the sensor electronics housing. The result is a reliable position measurement with high accuracy and repeatability.

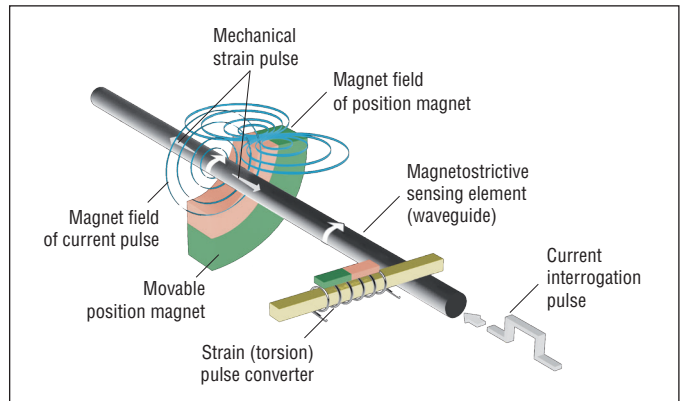


Fig. 1: Time-based magnetostrictive position sensing principle

## GT2/GT3 SENSOR

Robust, non-contact and wear-free, the Temposonics® linear position sensors provide best durability and accurate position measurement solutions in harsh industrial environments. The position measurement accuracy is tightly controlled by the quality of the waveguide which is manufactured by MTS Sensors. The position magnet is mounted on the moving machine part and travels contactlessly over the sensor rod with the built-in waveguide.

Temposonics® GT is a sensor with double or triple redundancy. Two or three independent measuring systems are integrated in one sensor housing. In particular the sensor is suitable for enhanced safety applications. The waveguide is installed in a pressure-resistant high-grade steel rod. That qualifies the sensor for measuring linear movements of control valves, fluid cylinders and drives in power plants for pitch settings at water- or wind turbines or for ship control systems and floodgates.

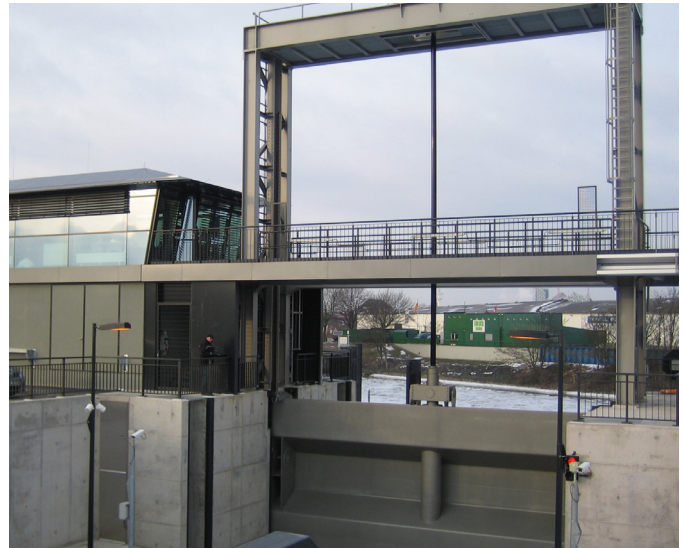


Fig. 2: Typical application: floodgate

## TECHNICAL DATA

Output	
Voltage	0...10 / 10...0 / -10...+10 / +10...-10 VDC (min. load controller: > 5 k $\Omega$ )
Current	4(0)...20 mA / 20...4(0) mA (min./max. load: 0 / 500 $\Omega$ )
Measured value	Position, the position is measured separately by two or three position measuring systems
Measurement parameters	
Resolution	Analog
Cycle time	< 2.5 ms
Linearity <sup>1</sup>	< $\pm 0.02$ % F.S. (minimum $\pm 50$ $\mu\text{m}$ )
Repeatability	< $\pm 0.001$ % F.S. (minimum $\pm 2.5$ $\mu\text{m}$ )
Operating conditions	
Operating temperature	-40...+75 °C (-40...+167 °F)
Humidity	90 % rel. humidity, no condensation
Ingress protection	IP67
Shock test	100 g (single shock) IEC standard 60068-2-27
Vibration test	5 g / 10...2000 Hz IEC standard 60068-2-6 (resonance frequencies excluded)
EMC test	Electromagnetic emission according to EN 61000-6-3 Electromagnetic immunity according to EN 61000-6-2 The sensor meets the requirements of the EC directives and is marked with <b>CE</b>
Magnet movement velocity	Any
Design/Material	
Sensor electronics housing	Aluminum
Sensor rod	Stainless steel 1.4306 / AISI 304L, option 1.4404 / AISI 316L
Stroke length	50...2900 mm (2...114 in.)
Operating pressure	350 bar (5076 psi), 690 bar (10 007 psi) peak
Mechanical mounting	
Mounting position	Any orientation
Mounting instruction	Please consult the technical drawings
Electrical connection	
Connection type	6 pin connector M16 or integral PUR cable
Operating voltage	+24 VDC (-15 / +20 %)
Ripple	$\leq 0.28$ Vpp
Current consumption	100 mA typical (each channel)
Dielectric strength	500 VDC (DC ground to machine ground)
Polarity protection	Up to -30 VDC
Overvoltage protection	Up to 36 VDC

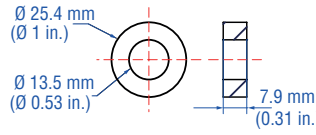
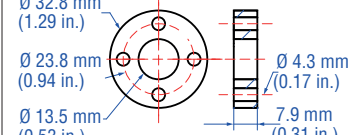
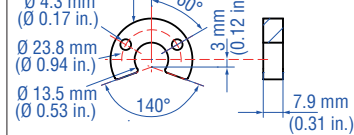
<sup>1</sup>/ With position magnet # 251 416-2



## ACCESSORIES

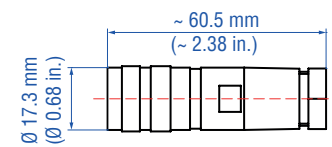
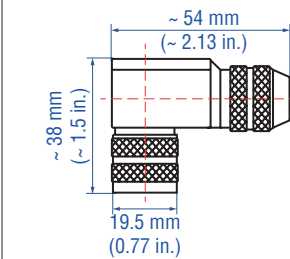
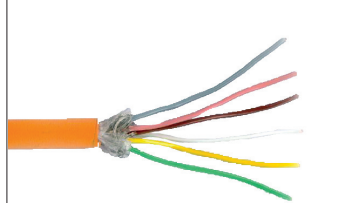
More accessories see  551444

### Position magnets

 <p>Ø 25.4 mm (Ø 1 in.) Ø 13.5 mm (Ø 0.53 in.) 7.9 mm (0.31 in.)</p>	 <p>Ø 32.8 mm (1.29 in.) Ø 23.8 mm (0.94 in.) Ø 13.5 mm (0.53 in.) Ø 4.3 mm (0.17 in.) 7.9 mm (0.31 in.)</p>	 <p>Ø 32.8 mm (Ø 1.29 in.) Ø 4.3 mm (Ø 0.17 in.) Ø 23.8 mm (Ø 0.94 in.) Ø 13.5 mm (Ø 0.53 in.) 60° 3 mm (0.12 in.) 140° 7.9 mm (0.31 in.)</p>
<p><b>Ring magnet OD25.4</b> <b>Part no. 400 533</b></p>	<p><b>Standard ring magnet</b> <b>Part no. 201 542-2</b></p>	<p><b>U-magnet OD33</b> <b>Part no. 251 416-2</b></p>
<p>Material: PA ferrite Weight: ca. 10 g Operating temperature: -40...+105 °C (-40...221 °F) Surface pressure: max. 40 N/mm<sup>2</sup></p>	<p>Material: PA ferrite GF20 Weight: ca. 14 g Operating temperature: -40...+105 °C (-40...221 °F) Surface pressure: max. 40 N/mm<sup>2</sup> Fastening torque for M4 screws: max. 1 Nm</p>	<p>Material: PA ferrite GF20 Weight: ca. 11 g Operating temperature: -40...+105 °C (-40...221 °F) Surface pressure: max. 40 N/mm<sup>2</sup> Fastening torque for M4 screws: max. 1 Nm</p>

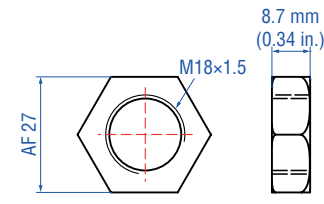
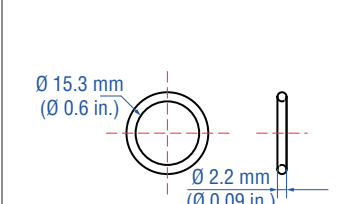


### Connectors

### Cable

 <p>~ 60.5 mm (~ 2.38 in.) Ø 17.3 mm (Ø 0.68 in.)</p>	 <p>~ 54 mm (~ 2.13 in.) ~ 38 mm (~ 1.5 in.) 19.5 mm (0.77 in.)</p>	
<p><b>Female, straight, 6 pin</b> <b>Part no. 370 423</b></p>	<p><b>Female, angled, 6 pin</b> <b>Part no. 370 460</b></p>	<p><b>Cable</b> <b>Part no. 530 052</b></p>
<p>Housing: zinc nickel plated Termination: solder Contact insert: silver plated Cable clamp: PG9 Cable Ø: 6...8 mm (0.24...0.32 in.)</p>	<p>Housing: zinc nickel plated Termination: solder Contact insert: silver plated Cable Ø: 6...8 mm (0.24...0.32 in.)</p>	<p>Dimensions: 3 × 2 × 0.25 mm<sup>2</sup> Cable Ø: 6.4 mm (0.25 in.) Material: PUR jacket; orange Operating temperature: -30...+80 °C (-22...176 °F) Twisted pair shielded</p>

### Optional installation hardware

### Programming tools

 <p>8.7 mm (0.34 in.) M18×1.5 AF 27</p>	 <p>Ø 15.3 mm (Ø 0.6 in.) Ø 2.2 mm (Ø 0.09 in.)</p>		
<p><b>Hex-jam nut M18</b> <b>Part no. 500 018</b></p> <p>Type: M18×1.5 threads Material: steel, 2 zinc, plated Application: M-style housings</p>	<p><b>O-ring</b> <b>Part no. 401 133</b></p> <p>Material: Fluoroelastomer 75 ± 5 durometer Application: M-style housings</p>	<p><b>Analog handheld programmer – G-Series; Part no. 253 853</b></p> <p>Programming for G-Series analog output sensor models</p>	<p><b>Programming kit – G-Series Analog; Part no. 253 145-1</b></p> <p>Kit includes: interface converter box, power supply, cable Software is available at: <a href="http://www.mtssensors.com">www.mtssensors.com</a></p>

## ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
G	T											1		
a			b	c					d			e	f	

<b>a</b>	<b>Sensor model</b>													
G	T	2	Dual redundant											
G	T	3	Triple redundant											

<b>b</b>	<b>Specification</b>													
F	¾"-16 UNF-3A, sensor rod 1.4404 (AISI 316L)													
M	Flange M18×1.5, sensor rod 1.4306 (AISI 304L)													
S	¾"-16 UNF-3A, sensor rod 1.4306 (AISI 304L)													
W	Flange M18×1.5, sensor rod 1.4404 (AISI 316L)													

<b>c</b>	<b>Stroke length</b>													
X	X	X	X	M	0050...2900 mm									
X	X	X	X	U	002.0...114.0 in.									

### Standard stroke length (mm)

Stroke length	Ordering steps
50 ... 500 mm	5 mm
500 ... 750 mm	10 mm
750...1000 mm	25 mm
1000...2500 mm	50 mm
2500...2900 mm	100 mm

### Standard stroke length (in.)

Stroke length	Ordering steps
2 ... 20 in.	0.2 in.
20 ... 30 in.	0.5 in.
30 ... 40 in.	1.0 in.
40...100 in.	2.0 in.
100...114 in.	4.0 in.

<b>d</b>	<b>Connection type</b>													
D	6	0	6 pin male connector M16											
H	0	2	2 m PUR-cable w/o connector, option H01...H10 (1...10 m; 3...33 ft)											

<b>e</b>	<b>Operating voltage</b>													
1	+24 VDC (-15 / +20 %)													

<b>f</b>	<b>Output</b>													
<b>Voltage</b>														
V	0	0...+10 VDC												
V	1	+10...0 VDC												
V	2	-10...+10 VDC												
V	3	+10...-10 VDC												
<b>Current</b>														
A	0	4...20 mA												
A	1	20...4 mA												
A	2	0...20 mA												
A	3	20...0 mA												

## DELIVERY



Sensor, O-ring

Accessories have to be ordered separately.

Operation manuals & software are available at:  
[www.mtssensors.com](http://www.mtssensors.com)



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